grained lath alpha-zirconium microstructure in part of the plate thickness and a recrystallized grain structure in the remainder. Zircaloy-2 has a low volume fraction of second phase particles that contribute to the plastic deformation behavior and corrosion resistance of the alloy. The mean second phase particle diameter of Plate A was 0.20μm. The mean second phase particle diameter of Plate B was 0.075μm.

IN THE CLAIMS

Please rewrite claims 1-7 and 18-35 as follows:

1. (Amended) A creep resistant zirconium-based alloy for use in nuclear fuel cladding, wherein the zirconium-based alloy comprises a coarse grained lath alpha microstructure, and wherein the zirconium-based alloy comprises an annular layer in the cladding.

2. (Twice Amended) The zirconium-based alloy as claimed in claim 1 wherein the microstructure comprises second phase precipitates.

3. (Twice Amended) The zirconium-based alloy as claimed in claim 2 wherein the second phase precipitates have a diameter less than about 0.15μm.

4. (Amended) The zirconium-based alloy as claimed in claim 3 wherein the microstructure is partially recrystallized.

5. (Amended) The zirconium-based alloy as claimed in claim 4 wherein the microstructure is less than 50% recrystallized.

6. (Twice Amended) The zirconium-based alloy as claimed in claim 1 wherein the microstructure has an acicular structure comprising a lath spacing within the range from about 0.5μm to about 3.0μm.

7. (Twice Amended) The zirconium-based alloy as claimed in claim 5 wherein the microstructure is an acicular structure and comprises a lath spacing within the range from about 0.5μm to about 3.0μm.

18. (Amended) The zirconium-based alloy as claimed in claim 2 wherein the second phase precipitates have a diameter less than about 0.10μm.

19. (Amended) The zirconium-based alloy as claimed in claim 2 wherein the second phase precipitates have a mean particle diameter of about 0.075μm.

20. (Amended) The zirconium-based alloy as claimed in claim 2 wherein the second phase precipitates comprise at least one of Fe and Cr.

21. (Amended) A creep resistant zirconium-based alloy for use in nuclear fuel cladding, said alloy comprising a coarse grained lath alpha microstructure, said alloy comprising approximately 1.2-1.7 weight percent Sn, approximately 0.13 to less than 0.20 weight percent Fe, approximately 0.06-0.15 weight percent Cr, approximately 0.05-0.08 weight percent Ni, and the balance being substantially zirconium, said alloy having been subjected to a predetermined treatment, and said alloy comprising an annular layer in said cladding.

22. (Amended) The creep resistant zirconium-based alloy of claim 21, wherein the predetermined treatment comprises:

beta heat treating a zirconium-based alloy to form a first intermediate;

fast quenching the first intermediate to form a second intermediate;

cold working the second intermediate to form a third intermediate; and

annealing the third intermediate to effect partial recrystallization of the microstructure.

23. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the cold working step further comprises cold working the second intermediate within the range from about 30% to about 40% to form the third intermediate.

24. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the cold working step further comprises cold working the second intermediate about 36% to form the third intermediate.

25. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the beta heat treating step occurs at a temperature above about 965°C.

26. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the beta heat treating step has a duration of from about 1 second to about 10 seconds.

27. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the fast quenching step is conducted at a cooling rate within the range from about 20°C/second to about 200°C/second.

28. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the annealing step is conducted within the temperature range of from about 570°C to about 640°C.

29. (Amended) The creep resistant zirconium-based alloy of claim 22, wherein the annealing step is conducted at about 620°C for about 3 hours.

30. (Amended) A creep resistant zirconium-based alloy for use in nuclear fuel cladding, said alloy comprising a coarse grained lath alpha microstructure comprising second phase precipitates, wherein the microstructure of the alloy is partially recrystallized after being subjected to a treatment comprising beta heat treating the alloy to form a first intermediate, fast quenching the first intermediate to form a second intermediate, cold working the second intermediate to form a third intermediate, and then annealing the third intermediate to effect partial recrystallization of the microstructure, wherein the alloy comprises an annular layer in the cladding.

31. (Amended) The creep resistant zirconium-based alloy of claim 30, wherein the second phase precipitates have a diameter less than about 0.15μm.

32. (Amended) The creep resistant zirconium-based alloy as claimed in claim 30, wherein the second phase precipitates have a mean particle diameter of about 0.075μm.

33. (Amended) The creep resistant zirconium-based alloy as claimed in claim 30, wherein the second phase precipitates comprise at least one of Fe and Cr.

34. (Amended) The creep resistant zirconium-based alloy of claim 30, wherein the microstructure is less than 50% recrystallized.

35. (Amended) The creep resistant zirconium-based alloy of claim 30, wherein the microstructure has a acicular structure comprising a lath spacing within the range from about 0.5μm to about 3.0μm.